

Amendment to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-29. (Canceled)

30. (Currently amended) A method comprising steps of:

loading a computer program onto an information processing system;

analyzing a certain key event in an execution of the program by nodes within the computer program, said analyzing comprising analyzing node transition from source nodes to destination nodes in nodes associated with the certain key event, wherein each associated node represents an object comprising a method invocation or a field assignment in the execution;

generating an object containment hierarchy of relationships ~~within~~ between the associated nodes of the computer program using a program analysis tool, wherein the object containment hierarchy comprises a description of how the each of the objects between the source node and the destination node are stored into each other nodes refer to other nodes; wherein ordering is implied, with earlier events at a top of the hierarchy and later events at a bottom of the hierarchy;

generating a temporal flow hierarchy using the program analysis tool, wherein the temporal flow hierarchy comprises control flow and node creation ~~and destruction~~ information, linking events contributing to a state of the program during the node transition and describing said events; wherein at least some of the events are not referenced in the object containment hierarchy;

wherein ordering is implied in both hierarchies, with earlier events at the top of the hierarchy and later events at the bottom of the hierarchy;

expanding the object containment hierarchy by appending the temporal flow hierarchy in a form of annotations, such that the annotations are linked with the associated nodes which they describe, to form an annotated object containment hierarchy; wherein the annotations are appended such that said annotations are distinguishable from the object containment graph;

~~annotating the object containment hierarchy with the temporal flow hierarchy to form an annotated object containment hierarchy; and~~

presenting at least a portion of the annotated object containment hierarchy in response to a user request.

31. (Currently amended) The method of claim 30 wherein the ~~annotating step comprises combining the annotated object containment hierarchy and the temporal flow hierarchy~~ is formed as a single hierarchy.

32. (Currently amended) The method of claim 30 wherein the ~~annotating step comprises combining the annotated object containment hierarchy and the temporal flow hierarchy into~~ is formed as a series of related hierarchies.

33. (Previously presented) The method of claim 30 wherein the program analysis tool comprises a tool selected from a group consisting of: a debugger, a runtime tracer, a profiler, a quality analyzer, and a static analyzer.

34. (Previously presented) The method of claim 33 wherein a visualization tool is integrated as part of the program analysis tool.

35. (Previously presented) The method of claim 33 wherein a visualization tool is configured to receive data relating to the computer program from the program analysis tool.

36. (Previously presented) The method of claim 30 wherein the presenting step comprises displaying at least one selected from a group consisting of: a control flow graph, an invocation graph, an object creation graph, an object reference graph, and a data dependence graph.

37. (Previously presented) The method of claim 30 wherein the presenting step comprises: presenting the object containment hierarchy in response to the user request;

receiving a selection of a node from the user; and
presenting at least a portion of the annotated object containment hierarchy, displaying annotations from a perspective of the selected node, responsive to the user selection.

38. (Previously presented) The method of claim 37 wherein the second presenting step comprises presenting the annotations in italics.

39. (Previously presented) The method of claim 37 wherein the second presenting step comprises presenting the annotations in brackets.

40. (Previously presented) The method of claim 37 wherein the receiving step comprises receiving a click on an icon representing the node.

41. (Previously presented) The method of claim 37 wherein the receiving step comprises receiving textual input from the user.